

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (previously presented) Phase contrast X-ray device (1) for creating a phase contrast image (17) of at least one object (4), comprising:

- at least one X-ray source (2) for generating X-radiation (11) that has a known spatial coherence (15) within a predetermined distance (6) from the X-ray source (2), and

- at least one evaluation unit (16) for converting the X-radiation (12, 13) that has passed through the object (4) that is arranged within the predetermined distance (6) from the X-ray source (2) into the phase contrast image (17) of the object (4), wherein:

- the X-ray source (2) has an output within a range of 50 W up to and including 10 kW;

- the X-radiation has a spatial coherence length (14) within the predetermined distance (6) from the X-ray source (2) in a range from 0.05 μm up to and including 10 μm ;

- the X-ray source (2) has a line-shaped focus (7), a longitudinal extension of the line-shaped focus (7) being aligned in a direction towards the object (4).

2-3. (canceled)

4. (previously presented) X-ray device according to claim 1 in which the X-ray source (2) has an X-ray tube with a transmission anode.

5. (previously presented) X-ray device according to claim 1 in which the X-ray source (2) produces parametric X-radiation (PXR).

6. (previously presented) X-ray device according to claim 1 in which the X-ray source is constructed so as to produce X-radiation (11) that has a specific temporal coherence (15).

7. (previously presented) X-ray device according to claim 1, further comprising at least one monochromator (18) for generating the temporal coherence (15) of the X-radiation (11).

8. (previously presented) X-ray device according to claim 1 in which the evaluation unit (16) has at least one analyzer (19) for analyzing the X-radiation (12, 13) after it has passed through the object (4).

9. (previously presented) X-ray device according to claim 7 in which the monochromator (18) has at least one gradient multilayer reflector (20).

10. (original) X-ray device according to claim 9 in which the gradient multilayer reflector (20) has a periodic

series of layers of a first layer type A (22) and at least a further layer type B (24) in which case the first layer type A (22) has a first refractive index r_A and a first layer thickness d_A (23) and a further layer type B (24), a further refractive index r_B and a layer thickness d_B (25) differing from the first refractive index r_A and in at least one direction of propagation of the reflector (20), there is a monotone increase in layer thicknesses by a total of $(d = d_A + d_B)$ (26).

11. (previously presented) X-ray device according to claim 9 in which the gradient multilayer reflector (20) has at least one area of reflection (27) from at least one of the elliptical, parabolic, planar, circular, and hyperbolic groups.

12. (previously presented) Method for creating a phase contrast image of an object comprising the steps of:

a) providing a phase contrast X-ray device (1) for creating a phase contrast image (17) of at least one object (4), comprising:

- at least one X-ray source (2) for generating X-radiation (11) that has a known spatial coherence (15) within a predetermined distance (6) from the X-ray source (2), and

- at least one evaluation unit (16) for converting the X-radiation (12, 13) that has passed through the object (4) that is arranged within the predetermined distance (6) from the X-ray

source (2) into the phase contrast image (17) of the object (4),
wherein:

- the X-ray source (2) has an output within a range 50 W up to and including 10 kW; and

- the X-radiation has a spatial coherence length (14) within the predetermined distance (6) from the X-ray source (2) in a range from 0.05 μm up to and including 10 μm ;

- b) Arranging the object within the predetermined distance from the X-ray source,

- c) passing X-radiation through the object and

- d) Creating the phase contrast image from where the X-radiation passes through an object by means of the evaluation unit.

13. (original) Method according to claim 12 in which the X-radiation forms an interference pattern after it has passed through the object that is detected for creating the phase contrast image.

14. (previously presented) Method according to claim 12, wherein at least one of an X-radiation which is deflected when passing through the object for creating the phase contrast image and an X-radiation which is non-deflected when passing through the object is detected.

15. (original) Method according to claim 14 in which at least one of the deflected X-radiation and non-deflected X-radiation is selected by means of an analyzer with a gradient multilayer reflector.

16. (previously presented) Method according to claim 12 in which several phase contrast images are created by means of the X-radiation of different spatial coherences that are processed to an overall phase contrast image by means of an image processing unit.

17. (previously presented) Method according to claim 16 in which the distance between the object and the X-ray source varies for generating the different spatial coherence.

18. (previously presented) Method according to claim 16 in which orientation of the object to the direction of propagation of the X-radiation varies for generating the different spatial coherence.

19. (previously presented) Method according to claim 12 in which an object that, in essence, consists of a material with a low absorption coefficient for the X-radiation is used.

20. (previously presented) Method according to claim 12 in which many phase contrast images of the object are created to generate a phase contrast computer tomogram of the object.